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NOTES ON WEST AFRICAN PIPEFISHES (SYNGNATHIDAE), WITH DESCRIPTION OF *ENNEACAMPUS*, N. GEN.

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Abstract.—*Syngnathus pellegrini* Fowler, described from Gabon, is based on mislabeled specimens from the western north Atlantic and is a junior synonym of *S. fuscus* Storer. The name *Enneacampus* is proposed for a new syngnathine (tail-pouch) genus characterized, in part, by a 9-ray caudal fin and by the presence of an anal fin, pouch-protective plates, and everted pouch-closure. The type-species (*Syngnathus ansorgii* Boulenger 1910) and its only congener, *Enneacampus kaupi* (Bleeker) are rediagnosed and illustrated; *Syngnathus pulchellus* Boulenger and *S. olssoni* Johnels are junior synonyms of *Enneacampus ansorgii*. *Oostethus brachyurus aculeatus* (Kaup) and the two species of *Enneacampus* are the only pipefishes known to occur commonly in shallow coastal or inland waters of west Africa between Sénégal and Angola (*ca.* 16°N–18°S); all are known to breed in fresh water.

The genus *Syngnathus* Linnaeus (type-species *S. acus* L.) has long been a catchall for pipefishes of varying lineages or uncertain taxonomic status. The number of nominal species is variously estimated at 40–50 or more, but the number of valid species more closely approaches 30. Studies on western African pipefishes currently referred to *Syngnathus* show that one name is a junior synonym of an extralimital species and that four nominal species, apparently freshwater forms, are not referrable to *Syngnathus* s.s. I here clarify the identity of *S. pellegrini* Fowler, propose a new genus for the accommodation of *S. ansorgii* Boulenger and *S. kaupi* Bleeker, and refer two nominal species (*S. pulchellus* and *S. olssoni*) to the synonymy of *S. ansorgii*.

In addition to species rediagnosed here (*ansorgii* and *kaupi*), preliminary studies indicate that only one other pipefish [*Oostethus brachyurus aculeatus* (see Dawson, 1979)] occurs commonly in the shallow coastal and inland waters of western Africa between Sénégal and Angola (*ca.* 16°N–18°S). Compared to the western Atlantic, with 14 coastal and inland species known from the same latitudes, western Africa supports a depauperate pipefish fauna.

Methods and Materials

Measurements (mm) are of total length (TL), standard length (SL) or head length (HL). Unless otherwise noted, color descriptions are from specimens preserved in alcohol; the term "venter" refers to the ventral surface of the head or body; other methods follow Dawson (1977). Abbreviations for repositories of material examined are: AMNH, American Museum of Natural History; ANSP, Academy of Natural Sciences, Philadelphia; BMNH, British Museum (Natural History), London; CAS-SU, Stanford University collections, how housed at California Academy of Sciences; GCRL, Gulf Coast Research Laboratory Museum; IRSNB, Institut Royal des Sciences Naturelles de Belgique, Brussels; MCZ, Museum of Comparative Zoology, Harvard University; MNHN, Muséum National d'Histoire Naturelle, Paris; NRM, Naturhistoriska Riksmuseet, Stockholm; RMNH, Rijksmuseum van Natuurlijke Historie, Leiden; UMMZ, Museum of Zoology, University of Michigan; USNM, National Museum of Natural History, Smithsonian Institution; ZMUC, Zoological Museum, University of Copenhagen.

Syngnathus pellegrini Fowler

Fowler (1919) described this species from four specimens (88–113 mm TL), reportedly collected in Gabon by P. B. DuChaillu. The name was listed by Fowler (1922) and he later (1936) gave the type locality as "coast of the French Congo." Additional specimens referrable to *S. pellegrini* have not been taken along the African coast. The validity of this species was questioned by Blache (1962) but it was included in a recent key to eastern Atlantic fishes (Blache et al., 1970).

The original description gives counts of 18 + 38 rings, 38 dorsal-fin rays and 4 + 6 subdorsal rings for the holotype (ANSP 975) and 18–20 + 37–38 rings and 35–37 dorsal-fin rays for the three paratypes (ANSP 976–978). My counts from these juveniles (now 83–107 mm SL) follow: rings 19 + 37–38; dorsal-fin rays 36, 37, 41, 42; pectoral-fin rays 13 (6 counts), 14 (2); caudal-fin rays 10; subdorsal rings 5–4 + 4.5–5.5. The configuration of principal head and body ridges is that of the genus *Syngnathus,* and the anal fin is present. Pertinent proportional values are: HL in SL 8.1–8.4, snout length in HL 2.1–2.2, snout depth in snout length 4.5 (in holotype), length of dorsal-fin base in HL 0.8–0.9.

These specimens are conspecific with *S. fuscus* Storer, a common species along the Atlantic coast of the United States. There have been a number of labeling problems with material thought to belong to the DuChaillu (or Duchaillu) west African collection and mislabeling of these western Atlantic pipefishes is not surprising. Fowler (1936) noted that *Ischnomembras gabunensis* Fowler 1903 is conspecific with the American atherinid *Menidia*

menidia (Linnaeus), and I am advised (in litt.) by Mrs. Eugenia Böhlke (ANSP) that at least three other species, treated as west African by Fowler (1919), are based on misidentified specimens of western Atlantic origin.

Enneacampus, new genus

Type-species.—*Syngnathus ansorgii* Boulenger 1910.

Diagnosis.—Superior trunk and tail ridges discontinuous near rear of dorsal fin, inferior trunk and tail ridges continuous, lateral trunk and tail ridges discontinuous below dorsal-fin base; venter of trunk clearly V-shaped, the median longitudinal ridge with or without a prominent fleshy keel. Snout length 1.8–2.8 in HL; median dorsal snout ridge not strongly elevated, usually ending on interorbital but sometimes continued to frontal ridge, its margin entire to finely denticulate in subadults and adults; interorbital depressed mesially but flared dorsolaterad toward orbits; median dorsal head ridges a little elevated; supraopercular ridge usually distinct; opercle with a complete, straight, longitudinal ridge, otherwise smooth or ornamented with fine striae; pectoral-fin base with superior and inferior ridges. Principal body ridges distinct but not strongly elevated, indented between rings, the margins finely denticulate to entire; posterior angles of tail rings not produced to spine-like points; scutella without longitudinal keels. Head and body devoid of dermal flaps, spines or prominent denticulations. Trunk rings 12–14 (mostly 13), total rings 44–50, dorsal-fin rays 22–29, pectoral-fin rays 12–17 (mostly 12–16), anal-fin rays 2–3, caudal-fin rays typically 9, the fin rounded distally. Dorsal-fin origin on last trunk ring or first tail ring, the fin-base not elevated, total subdorsal rings 5.0–6.5. Brood pouch below 12–18 tail rings; pouch plates present, angled a little laterad in brooding males; pouch-closure the everted type of Herald (1959); without odontoid processes in jaws (Dawson and Fritzsche, 1975) or bony inclusions in gill membranes (Dawson, 1978). Maximum size at least 173 mm TL.

Comparisons.—The principal body ridge configuration of *Enneacampus* (Fig. 1) is shared with several other syngnathine (tail-pouch) genera, but *Enneacampus* clearly differs in having 9 rather than 10 caudal-fin rays. In general appearance, species of *Enneacampus* (Figs. 2, 3) are most similar to those of *Bryx* Herald, *Parasyngnathus* Duncker, and *Syngnathus* s.s. *Enneacampus* also differs from *Bryx* in having an anal fin, and from *Parasyngnathus* in having well-developed pouch plates. *Enneacampus* has a complete opercular ridge, a supraopercular ridge, and everted pouch-closure, whereas species of *Syngnathus* lack the supraopercular ridge, lack a complete opercular ridge in subadults and adults, and pouch-closure is inverted. Furthermore, species of *Enneacampus* (2 specimens examined) lack the 3rd epibranchial and have one infrapharyngobranchial, whereas the 3rd epibranchial and two infrapharyngobranchials are present in *Syngnathus* (Fritzsche 1980).

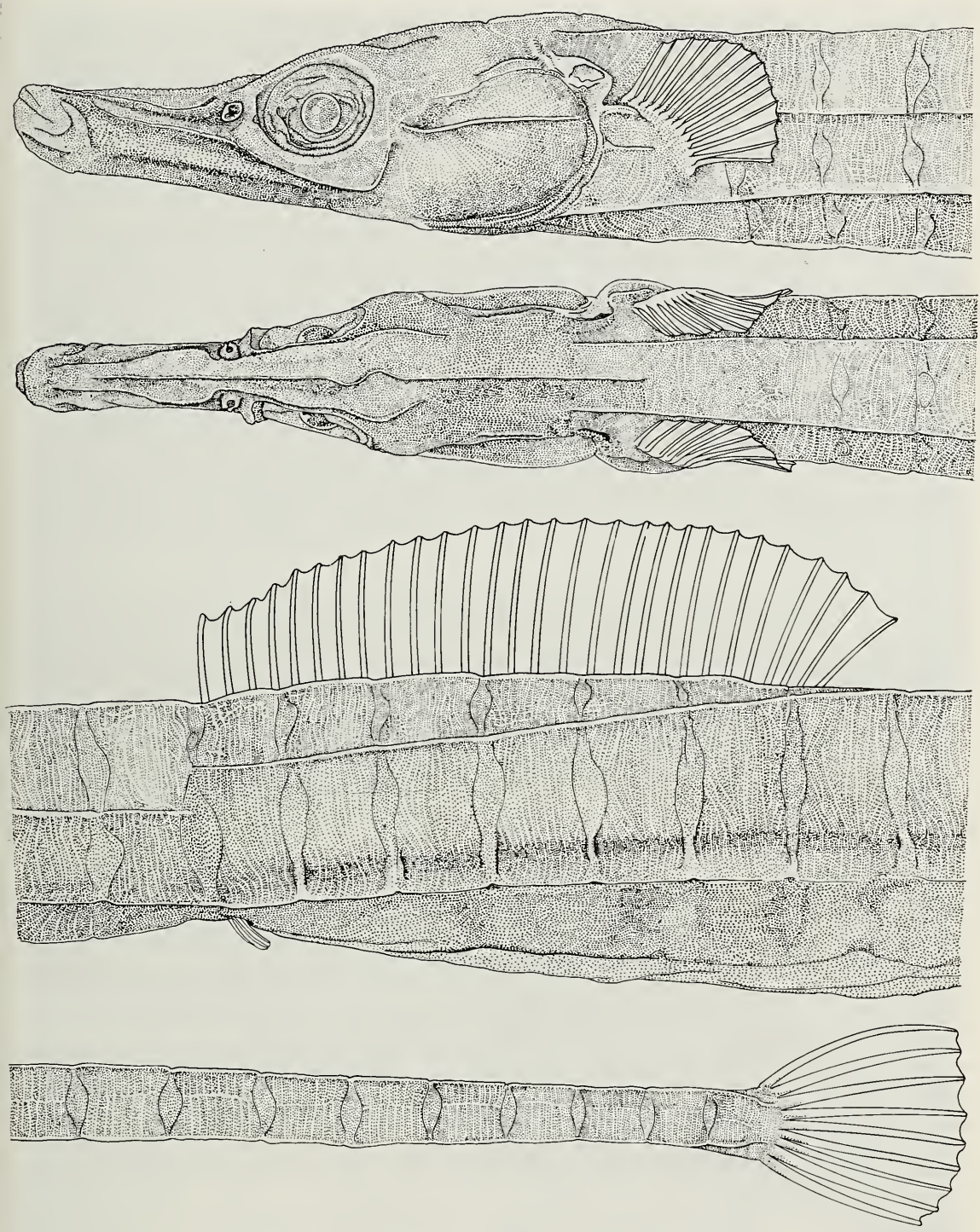
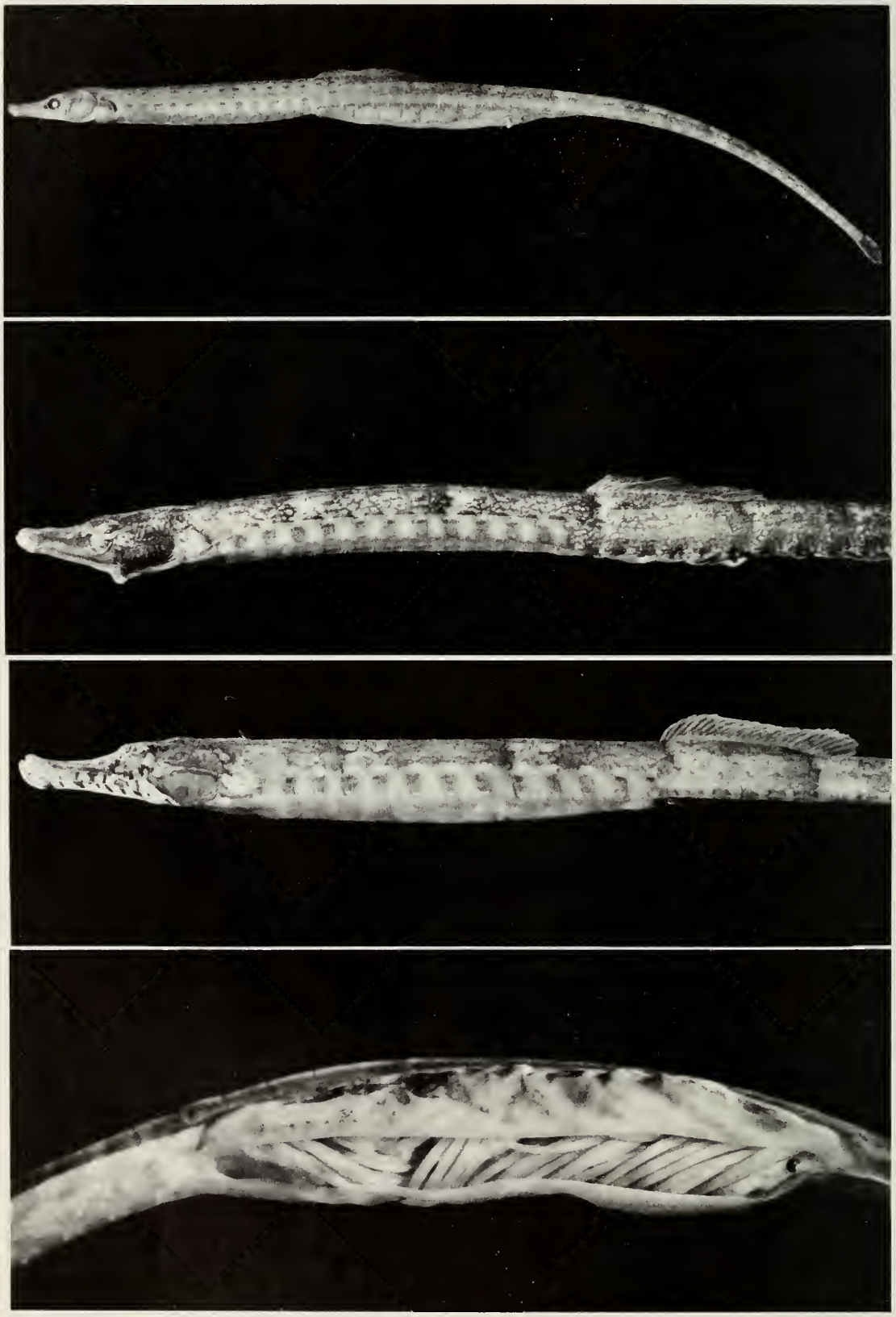


Fig. 1. *Enneacampus ansorgii*. Upper pair.—Lateral and dorsal aspects of head and anterior trunk rings. Lower pair.—Top: posterior trunk and anterior tail rings, together with dorsal and anal fins and anterior portion of brood pouch. Bottom: posterior tail rings and caudal fin. From 110.5 mm SL holotype (BMNH 1911.6.1.129).



The *Enneacampus* body ridge configuration is also shared with two gastrophorine (trunk-pouch) genera, the monotypic Australian *Leptoichthys* Kaup and the Indo-Pacific *Doryichthys* Kaup. Compared to the former, *Enneacampus* has fewer anal- and caudal-fin rays (respectively, 2–3 and 9 against 5 and 11) and lacks the very elongate snout and caudal fin characteristic of *Leptoichthys*. *Enneacampus* shares the 9-ray caudal fin with *Doryichthys* but differs from this trunk-pouch genus in having fewer anal-fin rays (4 rays in *Doryichthys*) and in having rounded pectoral fins (usually emarginate in *Doryichthys*).

Etymology.—From the Greek *ennea* (nine) and *kampos* (sea-animal), in allusion to the characteristic 9-ray caudal fin; gender, masculine.

Remarks.—Among pipefishes which retain the caudal fin from postlarva to adult, the number of caudal-fin rays is a highly conservative character useful in defining genera, and the typical number of rays ranges from 8 to 11 (except when damaged or regenerated). The majority of syngnathine and some gastrophorine genera have 10 caudal-fin rays, whereas the 9-ray fin is less common. Nine caudal-fin rays are characteristic of several trunk-pouch genera (e.g. *Doryichthys, Oostethus* Hubbs) but, among tail-pouch forms, the 9-ray fin is found only in *Enneacampus* and some Indo-Pacific species currently referred to *Trachyrhamphus* Kaup and *Yozia* Jordan and Snyder. In Atlantic waters, the 9-ray caudal fin is found only in the two species of *Enneacampus* and in eastern and western Atlantic populations of the widespread doryrhamphine *Oostethus brachyurus* (Bleeker).

Most pipefishes with the 9-ray caudal fin (except those referred to *Trachyrhamphus* or *Yozia*) are known to breed in fresh water. Although some with a 10-ray fin may also breed in fresh water (e.g. *Syngnathus scovelli* (Evermann and Kendall) and species of *Pseudophallus* Herald), the majority of pipefishes with other than 9 caudal-fin rays breed in estuarine or marine habitats.

Enneacampus ansorgii (Boulenger)
Figs. 1–2

Syngnathus ansorgii Boulenger, 1910:559 (orig. descr.; Quanza (= Cuanza) River, Angola); Boulenger, 1915:86, fig. 73 (in key, descr.); Clausen, 1956:227 (comparisons); Daget and Iltis, 1965:185 (in key); Thys, 1965:317 (listed, Fernando Póo); Thys, 1967:82, fig. 24 (descr., comparisons).

Syngnathus pulchellus Boulenger, 1915:88, fig. 74 (orig. descr., Gabon and

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Fig. 2. *Enneacampus ansorgii*. Top to bottom: BMNH 1911.6.1.129 (110.5 mm SL, male, holotype). UMMZ 187910 (94 mm SL, male). GCRL 15532 (110 mm SL, adult female). GCRL 15485 (ventral aspect of brood pouch of 82.5 mm SL male, illustrating disposition of pouch-young and brood-pouch folds).

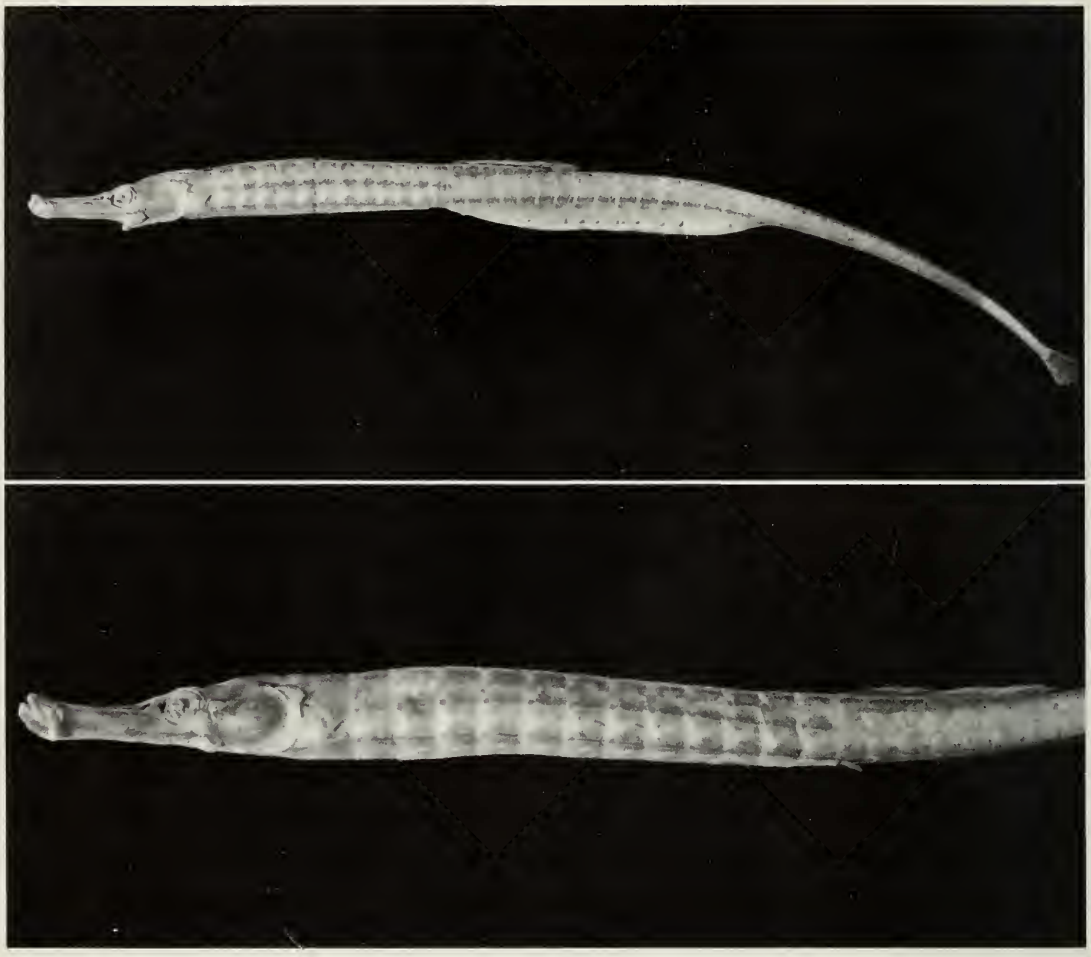

Fig. 3. *Enneacampus kaupi*. CAS-SU 63059: Top.—141 mm SL, brooding male. Bottom.—132 mm SL, adult female.

Cameroon); Clausen, 1956:227, pl. 1, figs. 1–2 (comparisons, Nigeria); Sterba, 1959:613, figs. (descr.; European aquarium trade import); Kähsbauer, 1962:159 (listed, Nigeria); Daget and Iltis, 1965:185 (in key; range); Thys, 1967:83 (in key, comparisons, possibly conspecific with *ansorgii*); Roman, 1970:147, 149, fig. 66 (in key, descr., Rio Muni); Wheeler, 1975:344, text fig. only (aquarium fish; West Africa).

Syngnathus (*Parasyngnathus*) *Ansorgei:* Duncker, 1915:85 (n. comb., misspelling, descr.).

Table 1.—Frequency distributions of trunk, tail, and total rings in species of *Enneacampus*.

	Trunk rings		Tail rings							Total rings						
Species	12	13	31	32	33	34	35	36	37	44	45	46	47	48	49	50
ansorgii	6	98	1	6	6	7	28	52	4	2	6	6	7	29	50	4
kaupi		18		5	12	1					5	12	1			

Table 2.—Frequency distributions of dorsal- and pectoral-fin rays and total subdorsal rings in species of *Enneacampus*.

	Dorsal-fin rays								Pectoral-fin rays						Subdorsal rings						
Species	22	23	24	25	26	27	28	29	12	13	14	15	16	17	5.00	5.25	5.50	5.75	6.00	6.25	6.50
ansorgii	1	5	5	14	42	25	6	2	28	86	43	8			5	18	40	29	17	2	1
kaupi					11	4	3				3	10	19	1			1	6	10	2	

Syngnathus olssoni Johnels, 1954:348, 399, fig. 18 (orig. descr.; Farida and Alikiama swamps, Gambia River); Clausen, 1956:227 (comparisons).
Syngnathus olsonni: Daget and Iltis, 1965:185 (misspelling, in key, Gambia and Guinea); Thys, 1967:83 (in key, possibly conspecific with *ansorgii*).

Diagnosis.—Rings 12–13 + 31–37 = 44–50; dorsal-fin rays 22–29; pectoral-fin rays 11–15 (14 or less in 95% of counts); total subdorsal rings 5.0–6.5; dorsal-fin origin from middle of last trunk ring to origin of 2nd tail ring, usually at anterior margin of 1st tail ring (70% of specimens examined). Proportional data based on 48 specimens 54–118.5 ($\bar{x}$ = 87.7) mm SL follow: HL in SL 8.4–10.8 (9.4), snout length in HL 2.1–2.8 (2.5), snout depth in snout length 2.4–4.0 (3.2), length of dorsal-fin base in HL 0.9–1.3 (1.1), anal ring depth in HL 2.7–4.7 (3.6), trunk depth in HL 2.2–3.3 (2.6), pectoral-fin length in HL 4.4–6.2 (5.2), length of pectoral-fin base in pectoral-fin length 1.2–1.7 (1.4). Median dorsal snout ridge of subadults and adults finely denticulate under ×30 magnification. See Tables 1–3 for additional counts.

Coloration.—Snout with or without irregular brown bars or blotches (Fig. 2); opercle with pale stripe along longitudinal ridge, with brownish diagonal bars below the ridge or mottled throughout; eye usually with short brown

Table 3.—Geographical variation in frequencies of dorsal-fin rays in *Enneacampus ansorgii*.

	Dorsal-fin rays							
Locale	22	23	24	25	26	27	28	29
Gambia		2	2					
Sierra Leone	1	1						
Ghana			2	4	2			
Nigeria			1	9	38	24	6	
Cameroon		1		1		1		
Gabon					2			
Zaire								1
Angola								1

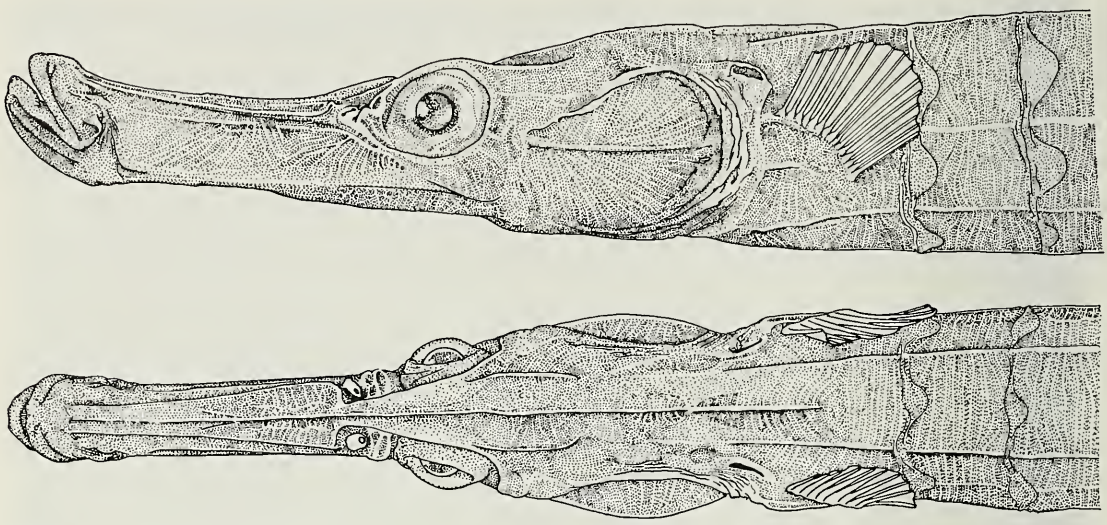

Fig. 4. *Enneacampus kaupi*. Lateral and dorsal aspects of head and anterior trunk rings. From 132 mm SL female (CAS-SU 63059).

bars radiating from pupil; head otherwise plain, mottled or blotched with brown. Body usually with indications of irregular, diffuse, pale bars crossing dorsum and upper part of sides on every 4th–5th ring; lower half of side of trunk usually with a rectangular brown blotch on each ring; side of trunk and tail otherwise variously mottled, blotched or shaded with brown. Dorsal fin hyaline distally, the proximal third or more of each fin-ray shaded with brown; proximal third of pectoral fin blotched or shaded with brown, otherwise hyaline; caudal fin irregularly blotched with brown, the margin usually pale.

Brood pouch and young.—The brood pouch is developed below 12–17 tail rings in 26 adult males (69.5–128.5 mm SL). One (75.5 mm SL) has a total of 17 eggs in a single 2-row layer through 12 or 14 pouch-rings, another (94 mm SL) has one layer of 35 eggs through 14 of 16 pouch-rings. Brood-pouch young (prolarvae and postlarvae sensu Hubbs, 1943) are unusually large, and one, representative of 32 postlarvae in an 82.5 mm SL male (GCRL 15485), measured 17.8 mm TL. When best developed, young completely fill the brood pouch, the pouch-folds fail to meet on the ventral midline, and the young are partly exposed (Fig. 2).

Comparisons.—The two species of *Enneacampus* overlap in meristic features (Tables 1–2) but *E. ansorgii* usually has fewer pectoral-fin rays (modally, 13 against 16 in *kaupi*). *Enneacampus ansorgii* has higher values for ratios of HL in SL ($\bar{x}$ = 9.4 against 7.1) and snout length in HL ($\bar{x}$ = 2.5 against 2.0) and these species also differ in other proportional features (see diagnoses). The median dorsal snout ridge is finely denticulate in subadult and adult specimens of *E. ansorgii* (typically entire in *kaupi*) and the quadrate dark blotches on the trunk rings are replaced by arcuate or semicircular

ocellate spots along the inferior trunk ridge in well-marked specimens of *E. kaupi*.

Limited observations suggest that these species also differ in reproductive capacity and in the size of brood-pouch young. Seven brooding males of *E. ansorgii* (75.5–94 mm SL) contained 17 to 36 brood-pouch eggs or postlarvae, whereas there were over 800 prolarvae in a male *E. kaupi* (141 mm SL). Several prolarvae and postlarvae from different males of *E. ansorgii* measured about 11–18 mm TL; prolarvae of *E. kaupi* are about 4.4 mm TL.

For practical purposes, these species are most readily distinguished by obvious differences in relative length of the snout (compare Figs. 1 and 4).

Types.—The holotype of *Syngnathus ansorgii* (BMNH 1911.6.1.129) has the following counts and measurements (mm): rings 13 + 36, dorsal-fin rays 29, pectoral-fin rays 14 × 15, subdorsal rings 0 + 6.5, brood-pouch rings 17, anal-fin rays 3, caudal-fin rays 9, SL 110.5, HL 11.4, snout length 4.9, snout depth 1.5, length of dorsal-fin base 12.1, anal ring depth 4.2, trunk depth 4.8, pectoral-fin length 2.3, length of pectoral-fin base 1.9. The nares open through a single pore bilaterally, the lateral trunk ridge ends without deflection on the left side but the distal extremity is deflected a little ventrad on the right, and some larvae are retained in the brood pouch. Boulenger's (1910) original counts of 15 + 37 rings and subdorsal rings are in error, but his illustration (Fig. 73) of the holotype shows 13 trunk rings and about 6.5 subdorsal rings.

The syntypes of *Syngnathus pulchellus,* conspecific with the holotype of *S. ansorgii,* consist of a 128.5 mm SL male (BMNH 1874.6.8.20) and a dried female (BMNH 1888.12.13.41) with an estimated TL of 100 mm. The dorsal fin is missing in the male and an accurate count of dorsal-fin rays cannot be obtained from the female. There are 5.75 subdorsal rings in the male, about 5.5 in the female; both have 9 caudal-fin rays; there are 13 + 34 rings in both, rather than the described count of 13 + 35. Lateral trunk and tail ridges are discontinuous on both sides of the male and on the left side of the female; lateral trunk ridges are not deflected distally. The right side of the female is anomalous in that the lateral trunk and tail ridges are confluent and this is the ridge configuration described for the species by Boulenger (1915). In addition to employing this atypical ridge pattern as a principal character distinguishing *S. pulchellus* from *S. ansorgii* and *S. kaupi,* Boulenger illustrated this configuration (Fig. 74) on the left side of the female syntype, although it is present only on the right.

Johnels' (1954) description of *S. olssoni* was based on six specimens, including one male with developed brood pouch, 63–73 mm TL. Four of these, including the illustrated male "type" (now 69.5 mm SL), are cataloged as NRM 11151; the fate of the others is unknown. These fish, conspecific with *S. ansorgii,* have discontinuous lateral trunk and tail ridges, the lateral trunk ridge is deflected ventrad only on the right side of a 67.5

mm SL female, and all have 9 caudal-fin rays. The specimen described as having confluent lateral trunk and tail ridges on the right side is missing. Johnels reported 14 trunk rings in all of his material but I count 13 in the four extant fish. My counts of other meristic features fall within the described range.

Variation.—Johnels (1954) and Clausen (1956) noted variation in the lateral body ridges in this species and Clausen questioned the reliability of the lateral ridge configuration as a taxonomic character. Among 199 configurations examined here, the typical pattern of discontinuous lateral trunk and tail ridges (Fig. 1) occurred in 196 and these ridges were confluent in two cases. The lateral trunk ridge was straight in 186, whereas it was deflected distally to end between the lateral midline and the inferior ridge in 11. In one instance, the superior trunk and tail ridges were confluent rather than discontinuous. Unilateral or bilateral variation is rather common in some pipefishes (e.g. *Syngnathus acus, S. schlegeli*), but in *Enneacampus ansorgii,* as in most species, ridge configuration varies in less than 10 percent of those examined and constitutes an important primary character.

The nares are typically 2-pored bilaterally in most pipefishes but the majority of *E. ansorgii* examined have a single opening on each side. This condition appears similar to that reported for *Corythoichthys schultzi,* an Indo-Pacific marine species (Dawson, 1977).

Available data (Table 3) suggest a north-south increase in frequencies of dorsal-fin rays from Gambia to Angola.

Distribution.—*Enneacampus ansorgii* is known from rivers, streams, and swamps from the Gambia River drainage to the Cuanza River, Angola. There are apparently no definite records of its occurrence in estuarine or marine habitats.

Material examined.—One hundred and thirteen specimens, 40.5–128.5 mm SL, excluding pouch-larvae.

Holotype.—BMNH 1911.6.1.129 (110.5 mm SL, adult male), Angola, Quanza (= Cuanza) River at Dondo, cast net, 13 July 1910, W. J. Ansorge.

Other material.—GAMBIA: NRM 11151 (4, 61.5–69.5), including holotype (male) and 3 paratypes of *Syngnathus olssoni*). SIERRA LEONE: UMMZ 187910 (2, 55–94). GHANA: CAS-SU 63060 (3, 56–76), CAS-SU 63061 (1, 63), CAS-SU 63062 (2, 40.5–70), CAS-SU 64635 (1, 88.5), MCZ 48079 (1, 105). NIGERIA: GCRL 15408 (1, 99.5), GCRL 15485 (3, 81.5–88), GCRL 15486 (2, 93–100), GCRL 15531 (2, 78–99), GCRL 15532 (2, 101–109.5), ZMUC P.39478–84 (7, 66–87), ZMUC P.39485 (1, 102), ZMUC P.39486–90 (5, 83–99), ZMUC P.39491–92 (2, 72–72.5), ZMUC P.39493–94 (2, 68–76.5), ZMUC P.39495–96 (2, 76–95.5), ZMUC P.39497–99 (3, 58–84), ZMUC P.39500–04 (5, 70.5–95.5), ZMUC P.39505–06 (2, 78–107), ZMUC P.39507–09 (3, 72–85.5), ZMUC P.39510 (1, 88), ZMUC P.39511 (1, 80), ZMUC P.39512–17 (6, 54–100), ZMUC P.39518 (1, 70), ZMUC P.39519–21

(3, 57.5–99), ZMUC P.39522–28 (7, 49.5–93), ZMUC P.29529–42 (14, 70.5–92.5), ZMUC P.39543–49 (7, 80–95.5), ZMUC P.39550–51 (2, 75.5–98.5), ZMUC P.39552–53 (2, 99.5–105), ZMUC P.39554–55 (2, 95–105.5), ZMUC P.39556 (1, 94). CAMEROON: BMNH 1874.6.8.20 (128.5, syntype of *S. pulchellus*), MNHN 29.91 (1, 84), MCZ 48149 (2, 66–81). GABON: BMNH 1888.12.13.41 (ca. 100, dried syntype of *S. pulchellus*), GCRL 16280 (1, 49), MNHN 06-211 (2, ca. 77–95). ZAIRE: IRSNB 19412 (1, 118.5).

Enneacampus kaupi (Bleeker)
Figs. 3–4

Syngnathus spicifer (not of Rüppell): Kaup, 1856:34 (misident. in part, Guinea sp. only).

Syngnathus Kaupi Bleeker, 1863:24, pl. 4, fig. 2 (orig. descr., Guinea); Duméril, 1870:542, 547 (in key, descr. compiled).

Syngnathus kaupi: Günther, 1870:174 (descr. compiled); Lönnberg, 1895 (Cameroons); Boulenger, 1912:23 (freshwater lagoon at Chiloango, Bas-Congo); Boulenger, 1915:86, fig. 72 (in key; descr.; Degama and Chiloango, Congo); Metzelaar, 1919:217 (listed); Fowler, 1936:556 (in key, descr. compiled, Liberia to Congo); Cadenat, 1950:300 (listed; Guinea, Sierra Leone, Dahomey); Poll, 1953:251, fig. 102 (descr., Liberia to Congo); Clausen 1956:227 (comparisons; Boulenger's (1915) "Degama" should be Degema, Lower Niger); Kähsbauer, 1962:159 (listed, Nigeria); Daget and Iltis, 1965:185, fig. 114 (in key; descr.; Ivory Coast; type loc. given incorrectly as Ghana); Blache et al., 1970:242, fig. 656 (in key); Roman, 1970:147, fig. 65 (in key; descr.; Rio Muni).

Syngnathus kaupii: Büttikofer, 1890:480 (emendation, Liberia).

Syngnathus Kaupii: Steindachner, 1894:89 (Liberia).

Syngnathus (*Parasyngnathus*) *Kaupi:* Duncker, 1915:85 (n. comb.; descr.; Liberia to Gabon); Monod, 1927:680 (food item of *Galeoides decadactylus*; Souelaba, Cameroon).

Diagnosis.—Rings 13–14 + 32–34 = 45–47; dorsal-fin rays 26–28; pectoral-fin rays 14–17 (15 or more in 91% of counts); total subdorsal rings 5.5–6.25; dorsal-fin origin from anterior margin to middle of 1st tail ring, usually at anterior margin (90% of specimens examined). Proportional data based on 15 specimens 55–141 ($\bar{x}$ = 91.1) mm SL follow: HL in SL 6.7–7.5 (7.1), snout length in HL 1.8–2.1 (2.0), snout depth in snout length 3.2–5.4 (4.5), length of dorsal-fin base in HL 1.2–1.6 (1.4), anal ring depth in HL 3.4–5.3 (4.4), trunk depth in HL 2.8–3.7 (3.2), pectoral-fin length in HL 5.9–8.0 (6.7), length of pectoral-fin base in pectoral-fin length 1.1–1.5 (1.3). Median dorsal snout ridge usually entire under ×30 magnification. See Tables 1–2 for additional counts.

Coloration.—Roman (1970) described recently collected material as gen-

erally dusky with a brick-red abdomen; the head plain in males but with black bars below eye and on lower part of opercle in females; lower part of side (of trunk) greyish-yellow, with a golden, black-margined, ocellus on each ring; tail rings black spotted, sprinkled with gold; caudal fin black, edged with pale. Somewhat faded specimens (CAS-SU 17148) have the dorsum and upper parts of sides of body crossed by about 10 narrow and diffuse pale bars (spaced ca. 4–5 rings apart); each trunk ring with a dark-margined arcuate or semicircular brown spot extending dorsad from the inferior ridge; pouch-plates of male with an alternating series of short pale and brownish bars; dorsal-fin rays and pectoral fins shaded lightly with brown microchromatophores; caudal fin brown, with narrow pale margin.

Brood pouch and young.—The brood pouch is developed below 16–18 tail rings in four brooding males (83–141 mm SL) and an immature male (71 mm SL) has evidence of pouch development below 15 rings. None of the available males have eggs, but pouch-young are present in three. The largest and best preserved male (141 mm SL) has coiled prolarvae (ca. 4.4 mm TL), arranged in about four transverse rows and in two layers, through 15 of the 17 pouch-rings; the number of young is conservatively estimated at 850–900.

Comparisons.—See under *E. ansorgii*.

Holotype.—Bleeker (1863) recorded 14 + 34 rings, 26 dorsal-fin rays, 16 pectoral- and 10 caudal-fin rays for the 173 mm TL, female, holotype of *E. kaupi*. This specimen (RMNH 3874) now lacks the caudal fin and part of the tail, the dorsal fin originates at the anterior margin of the 1st tail ring and there are 6.25 subdorsal rings. Other counts and measurements (mm) follow: trunk rings 13, remaining tail rings 28, dorsal-fin rays 26, pectoral-fin rays 16 × 16, head length 21.4, snout length 10.9, snout depth 2.0, length of dorsal-fin base 16.2, trunk depth 7.1. Bleeker's atypical count of 10 caudal-fin rays suggests an error in enumeration or a regenerated fin.

Variation.—Atypical body ridge configurations were not noted in material examined and meristic data show no evidence of geographic variation. Five specimens examined had 2-pored nares bilaterally, whereas one had a single pore on the right side and two on the left. Roman (1970) recorded 14 trunk rings for two of 16 specimens from the Rio Muni region. This count was 13 in the remainder of Roman's material and in all specimens examined here.

Distribution.—Present materials show that *E. kaupi* ranges from Guinea to Zaire where it has been taken with *E. ansorgii* in the Banana River. There is a record from the Loemé River estuary (Congo) and Boulenger noted the occurrence of this species in brackish water, but most collections are apparently from freshwater. The only record of *E. kaupi* from marine waters is apparently that of Bas (1974) and Lloris and Rucabado (1979). I have been unable to obtain this specimen, trawled in 24 meters off Punta Durnford (23°12′N, 16°20′W), and its identity requires verification.

Material examined.—Nineteen specimens, 55– ca. 165 mm SL, excluding pouch-larvae.

Holotype.—RMNH 3874 (now 152.5 [orig. ca. 165 mm SL], damaged female), Guinea.

Other material.—LIBERIA: CAS-SU 48408 (3, 55–77), RMNH 5401 (1, 79.5). GHANA: CAS-SU 63059 (2, 132–141), USNM 219173 (2, 78–99.5). NIGERIA: BMNH 1902.11.10.301 (1, 68.5). CAMEROON: CAS-SU 17148 (2, 73.5–101), GCRL 17011 (1, 98.5). CONGO: MNHN 1967-185 (1, 110.5), MNHN 1967-186 (1, 63.5). ZAIRE: AMNH 17135 (1, 83), BMNH 1912.4.1.475–6 (2, 97–119), IRSNB 8701 (1, 84.5).

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